**Comments**
**Draft Lower Passaic River Study Area Baseline Ecological Risk Assessment**
**Submitted June 13, 2014 by the Lower Passaic River Study Area Cooperating Parties Group**

## General Comments

| Comment No. | Comment |
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| 1 | Calculated Hazard Quotients for all media must be clearly presented and discussed in the document, both in detail in the relevant sections and in summary form elsewhere in the document (for example, in the Executive Summary). All EPCs must be presented, and compared to their respective TRVs and resulting HQs. Most notably, the main text of the document does not include a table or even a detailed discussion of sediment EPCs as was presented for other media, even though sediment most likely represents the primary pathway for exposure of ecological receptors to site-related chemicals.<br><br>The document should be prepared in such a way that determining the overall characterization of risk through all media is straightforward, clear and transparent. Please review the entire document and revise accordingly. |
| 2 | For the majority of receptors and exposure pathways, the draft BERA evaluates the river as a single exposure unit by combining all of the data into one exposure point concentration (EPC). In order to fully characterize ecological risks, EPCs must also be developed to evaluate smaller areas. For each receptor and/or exposure pathway, EPCs and their associated risk estimates should be provided for individual mudflats, increments based upon river mile and increments based upon zone (e.g., estuarine, transition, freshwater). |
| 3 | The draft BERA appears to eliminate evaluations of chemical contamination in common carp, a benthic omnivorous fish. Benthic omnivorous fish are instead represented by mummichog and banded killifish/darters. As stated in the summary of the Problem Formulation in the Executive Summary of the draft BERA, risks are to be evaluated using species representing specific trophic levels or feeding guilds. Refer to the following text excerpted from the Executive Summary on page ES-10:<br><br>*"In the problem formulation, focal species or representative species per feeding guild are selected for evaluation of that particular feeding guild. For example, the spotted sandpiper was selected to represent probing invertivorous birds that may forage in the LPRSA."*<br><br>The draft BERA notes that a wide variety of aquatic species were collected and analyzed for contaminants. These include American eel, blue crab, brown bullhead, carp, channel catfish, largemouth bass, northern pike, smallmouth bass, white catfish, white perch, white sucker, and SFF (i.e., gizzard shad, mixed forage fish, mummichog, pumpkinseed, silver shiner, spottail shiner, and white perch). Despite this large dataset, the draft BERA limits discussion of contaminants in fish tissue to only a subset of these taxa, and there is little or no discussion of contaminant concentrations measured in several of the taxa collected. Examples of fish for which tissue data are available yet not evaluated |

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| | are carp and multiple ictalurids, none of which are discussed in the draft BERA. Table 4-3 indicates that evaluation of carp and white sucker tissue data is limited to the uncertainty section. Elimination of chemical data for these species' tissue results in the elimination of representatives of a group of receptors.<br><br>All available biota tissue data need to be evaluated in the risk characterization section of the BERA. |
| 4 | Stated low risks to benthic communities appear to be linked to assumptions that only the upper few centimeters (often stated as including only the upper 1-2 cm) of sediment are inhabited or used by benthic macroinvertebrates (BMI). This assumption is not supported by observations or the literature, which clearly identify deeper sediments often stated to be at least the upper 15 cm, and possibly including depths of several feet for some polychaetes and oligochaetes as habitat to BMI. The draft BERA states in numerous locations that the biologically active zone is 0 to 15 cm, while concluding that BMI are limited to or nearly limited to the upper 2 cm of surface sediments. There is also inconsistency in how the draft BERA defines surface sediment – in some instances it is defined as the biologically active zone and in others as the depth of sediments used by BMI.<br><br>Throughout the BERA the following statement is presented:<br><br>*"The chemical signatures in sediment from this shallow biologically active zone (the 0-to-2-cm depth interval) may differ from the chemical signatures of deeper sediments collected from the LPRSA (from 0 to 15 cm)."*<br><br>It is unclear what the point of the above statement may be regarding the BMI community habitat. What we do know is that there is insufficient data to determine whether there are significant differences between the depths or the directionality of any differences. Based on the very small number of high resolution coring results available, the shallower depth horizon may have lower or higher concentrations.<br><br>The entire document must be revised to resolve these inconsistencies and address these issues. |
| 5 | There is a large gap between TRVs/CBRs that are supported by EPA and TRVs/CBRs that are supported by the CPG. Many of the TRVs EPA has recommended for use have been discarded with a bias towards minimizing risk. For example, there is much discussion throughout the draft BERA of the low magnitude of HQs (generally below 2), yet those same low HQs are often based on selection of higher (and less appropriate) TRVs. For example, the HQ would be considerably higher if an alternate (and more appropriate) TRV were used to derive the HQ for total PCBs in fish eggs.<br><br>The risk characterization sections must use appropriately conservative TRVs, including values referenced throughout these comments. EPA will accept the presentation of multiple TRVs/CBRs for individual compounds in the BERA to provide upper- and lower-bounds of risk estimates. |

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| 6 | The methodology used to evaluate whether individual data points should be used for background and reference comparisons needs to be modified. The metrics approach developed by EPA and presented to the CPG in May 2014 should first be conducted, followed by an appropriate outlier analysis. For example, the outlier analysis presented in the draft BERA used an interquartile range and 3x to determine if a result was an outlier. A value of 1.5x would be more appropriate.<br><br>EPA will provide a specific set of samples that should be used for either background or reference. In addition, EPA will provide specific details on how to incorporate this information into the document. This information will be provided within the next few weeks. |
| 7 | The draft BERA minimizes the discussion of, and in some cases fails to recognize, observed or predicted impairment or toxicity without reference to background or reference areas. While consideration of local background or reference area data is appropriate at some point in the risk assessment, especially for risk management decision-making, it is also appropriate to present and discuss risk based on site data compared to effects data (e.g., 95% UCLs for contaminant concentrations in surface water or sediment compared to TRVs, chronic NRWQC, TECs, or PECs). This is especially critical where selected locations representing local background or reference conditions are known or expected to be contaminated (i.e., both site and background are impaired, but background less so).<br><br>The BERA must discuss the implication of elevated risk estimates without comparison to background. The current text appears to minimize risk estimates for the site by consistently including background or reference data, leading to the conclusion of little or no risk simply because risk estimates for the site are below background.<br><br>Please review the entire document and revise accordingly. |
| 8 | Numerous locations in the draft BERA appear to minimize calculated risks because it is assumed that elevated HQs are likely associated with impacts to individual organisms, but not to populations. In fact, HQs based on survival, growth or reproduction endpoints can and should be assumed to have the potential to affect not just individuals, but local populations as well. It is a common and accepted practice to extrapolate toxicity test results and similar types of data to populations and communities.<br><br>Please revise the document accordingly. |
| 9 | In many places (Section 2.1 is a good example), the draft BERA includes an extensive discussion of the stressors that are known or expected to be influencing the conditions to which ecological receptors may be exposed. These are stated to include poor quality habitat (physical conditions), channelization, weather, invasive species and discharges from CSOs and other point sources related to stormwater. These discussions are not appropriately balanced because chemical contamination from past or current industrial sources is minimized relative to physical conditions and stormwater inputs or in some cases not even included as a potential source of ecological stress.<br><br>These discussions need to be revised to provide a more accurate and balanced presentation that clearly identifies chemical contamination as a major ecological stressor, and the appropriate focus of a CERCLA BERA, regardless of comparisons to background or reference areas. |

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| 10 | The uncertainty sections appear to evaluate the impact of other approaches, but such discussions are primarily one-sided. For example, in the evaluation of risks based on fish eggs, alternate HQs are discussed based on the use of a higher, mummichog-specific egg LOAEL, which would result in a lower HQ for dioxins/furans in fish eggs. There is no parallel discussion of alternative HQs if a lower (and likely more appropriate) TRV were to be selected for total PCBs in fish eggs (in which case the HQ would increase about five-fold).<br><br>Please review the entire document and revise accordingly. |
| 11 | Setting non-detect values to zero rather than using EPA-approved statistical software (e.g., ProUCL) requires justification beyond just a discussion in the uncertainty sections. It is unclear why a standardized approach is not used throughout the draft BERA. Setting non-detect values to zero may underestimate risks where reporting limits are high. The same approach for addressing non-detect values should be used in both the BERA and the HHRA. |
| 12 | The term "unacceptable risk" is never defined in the document. The term should be described in the Executive Summary and in Section 1, as defined in the NCP. |
| 13 | The total TEQs should be evaluated by a calculation of the sum of PCDD/PCDF/PCB TEQs together for each individual sample. In addition, evaluation of PAHs in sediment should be conducted using EPA's toxic unit approach, calculated for 34 PAHs. |
| 14 | The SSP2 data must be incorporated into the next draft of the BERA report. Any other RI data not previously included should also be incorporated. |

**Specific Comments**

| Comment No. | Section | Comment |
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| 15 | Executive Summary | The Executive Summary will need to be revised once all other comments are addressed. |
| 16 | Page 1, Section 1 | 3rd Paragraph: In the last sentence, the reference to NRC 2001 should be removed; 4th Paragraph: The first sentence ("Developing site specific BERA is particularly….") should be deleted. |
| 17 | Page 2, Section 1 | First paragraph: The last sentence of this paragraph should cite to a reference ("Its distinguishing factor…."). <br><br> Second paragraph: The 7th sentence of this paragraph ("USEPA also identified….") makes it sound like all of contaminants listed come from Lister Avenue.  Please modify so that the language is included as part of a discussion of other industrial sources of contaminants along the lower Passaic River. <br><br> Second paragraph: The last 4 sentences of this paragraph should be deleted and a sentence added to summarize this information, so that the last 2 sentences of this paragraph become: "The property itself was identified as operable unit (OU)-1 of the Diamond Alkali Superfund site.   Subsequent investigations in the Passaic River and Newark Bay have been undertaken as additional operable units." |
| 18 | Page 11, Section 2.1 | In the last sentence of the 2nd paragraph of this section, please replace the words "extensively restricted" with "limited" for consistency with the RARC. |
| 19 | Page 12, Section 2.1 | Please provide a citation for the statement in the last sentence of the 2nd paragraph of this page ("The frequent and intense disturbance…."). |

5

| 20 | Page 15, Section 2.1.1 | Missing from the discussion of the influence of non-chemical stressors is acknowledgement that for a tidally influenced environment, some of the factors mentioned (wide fluctuations in salinity, freshwater flow, turbidity, OC content, some nutrient inputs) are natural conditions of an estuarine environment for which the native biota are well adapted. However, native receptors may become excessively stressed by man-made influences from both chemical and physical modifications to the system. |
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| 21 | Page 21, Section 2.1.1.3, second paragraph | The text indicates that carp are responsible for a wide variety of impacts on the Passaic River. The text does not supply any site-specific information, such as chlorophyll a measurements with and without carp, and there is no discussion regarding other sources that could impact the river in similar ways, such as Canada geese, mallard ducks, etc. This discussion should be removed from the document. |
| 22 | Page 25, Section 2.1.1.7 | Additional information should be added to this section to provide a historical and seasonal perspective on DO concentrations, as well as a discussion on current conditions, if known. |
| 23 | Page 27, Section 2.1.1.8, second paragraph | There are no site-specific data to support the conclusions made in Appendix N and there is a lack of information on other sources that could have similar impacts. The entire appendix should be deleted, and this paragraph should be removed from the document. |
| 24 | Page 27, Section 2.1.2.1 | The phrase "small patches or isolated areas" inadequately describes mudflat areas in this river and diminishes their importance as preferred avian forage areas. Mudflats are a significant feature of interest in this river for both ecological habitat and contaminant accumulation. For this reason, improved description of the areal extent of mudflats in the LPRSA is needed. Either in this section, or elsewhere in the report, each mudflat area needs to be identified and described based on dimensions (overall acreage and/or length along the riverbank). |
| 25 | Page 28, Section 2.1.2.2 | The statement that "very little" riparian habitat exists is imprecise and subjective. Please clarify. |
| 26 | Page 36, Section 2.2.1 | The benthic salinity zones identified on this page are different from the salinity zones identified on Page 16. The differences between designating these zones based on salinity of sediment and salinity of surface water need to be discussed and additional text should be added to discuss the impacts of these differing designations on estimated risks. |

| 27 | Page 39, Section 2.2.1.1, and page 42, Table 2-2 | This section and table indicate that the most abundant BMI are worms, primarily polychaetes and oligochaetes, depending on the salinity of the water at the sampling stations. Given this dominance, it is important to recognize that these organisms live and forage in sediments over a fairly wide range of depths (e.g., many polychaetes burrow within the upper 10 cm of sediment, but some burrow much deeper), and that restricting the biologically active layer of sediments to the upper few cm (as noted throughout the document) is inappropriate for estimating sediment-associated risks.<br><br>Please make the appropriate changes throughout the document. |
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| 28 | Page 51, Figure 2-19 | Please show this figure for each category of benthos (e.g., detrivore, etc.). |
| 29 | Page 56, Section 2.2.1.4 | It appears that the method used to determine successional stage results in disagreement with the SPI data. Please provide some comparison of these results to the SPI results and explain the rationale for selecting one method over another. |
| 30 | Page 62, Section 2.2.2 and Table 2-3 | The text indicates that only a "very small number of other invertebrates encountered were either bivalves (n = 2 organisms) or gastropods (n = 1)". In addition, Table 2-3 identifies clams as "unspecified". This is inconsistent with the text in Section 2.2.1.3, which indicates that the clam *Corbicula* are relatively common, and even "highly abundant" above RM 7.3. In addition, other species of bivalves are present in the LPRSA based on the benthic surveys conducted in 2009 and 2010.<br><br>Please revise, as appropriate. |
| 31 | Pages 63-66, Section 2.3 | This section inadequately summarizes some of the results of the 2009-2010 fish surveys. The counts of the most commonly collected benthic omnivorous fish shown on Table 2-4, from most to least, are mummichog (1,696), American eel (743), striped killifish (412), banded killifish (359), common carp (215), and bluegill (146). In Section 2.3.1, it is correctly stated that killifish (all taxa) and small American eel dominate the benthic omnivore fish community. Of the more commonly collected benthic omnivorous fish, only common carp and eel are likely to routinely attain a size large enough to serve as prey for larger piscivorous predators (and possibly humans). Inclusion of larger benthic omnivorous fish such as carp in discussions of exposed ecological receptors (and in risk estimation) is critical, especially since carp are potentially among the most highly exposed types of fish (fatty, long-lived, and intimately associated with sediments).<br><br>Please make the appropriate changes here and throughout the document. |
| 32 | Page 64, Table 2-4 | Alewife is a planktivore, not a benthic omnivore. Please revise the table to reflect this. |

7

| 33 | Page 67, Section 2.3.1 | Unless described elsewhere, the stage of life and timeframes (length of time, frequency and sediment depth) that American eel are likely to interact with Passaic River bed sediment should be described for improved perspective on potential exposure to contaminated media in the study area. |
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| 34 | Pages 71 to 72, Section 2.3.6 | This section should include additional information on the life cycle of the target fish species (per feeding guild, and especially for those found most abundantly such as the White Perch, American eel and others) relative to their expected time spent in the Lower Passaic River. If this information is provided elsewhere, a citation here is appropriate. |
| 35 | Page 72, Figure 2-25 | This is a typical food pyramid with predators on top and producers on the bottom. It is not consistent with just an urban river, but with all aquatic systems (terrestrial too). Please revise the last paragraph on this page to clarify. |
| 36 | Page 72, Section 2.3.6, last paragraph, last sentence | The text states that benthic fish "exploit" settling solids coming from impervious surfaces and CSOs. Assuming this implies feeding, additional text should be added to include solids that are constantly suspended by tides and other forces and are contaminated with site-related chemicals.

In addition, this entire sentence is drawing conclusions about urban rivers in general.  Please add a citation to support this, or remove the statement. |
| 37 | Page 73, Section 2.4 | This section states: "The LPRSA provides limited and fragmented habitat for avian species. There are limited mudflats for sediment-probing birds and some riparian habitat for species inhabiting the shoreline, and significant marsh habitat is largely absent from the LPRSA shoreline…."

While there are limited mudflats, this condition needs to be placed in context of the wider area, in that the available mudflats, which constitute at least 30% of the shoreline habitat, are quite important to the receptors that utilize them. Relative to the densely developed surrounding land use, the available mudflats are of prime importance to avian species in the area. |
| 38 | Pages 74-75, Table 2-5 | Double-crested cormorant, belted kingfisher and boat-tailed grackle are listed on the table; however, it is not indicated in which seasons these birds were observed. Please revise the table as appropriate. |
| 39 | Page 77, Section 2.4.2, first paragraph, last sentence | Canada geese do breed on the Passaic River; their young and nests have been observed. Please revise the text to reflect this. |

8

| 40 | Page 80, Section 2.4.5, first full paragraph, last sentence | Cormorants do nest in Newark Bay. Please revise the text to reflect this. |
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| 41 | Page 81, Section 2.5, fifth sentence | The only species of chipmunk that exists on the east coast is *Tamias striatus*; please subsititute this species for "unidentified species of chipmunk" . There are also seals in the area; please revise the text to reflect this. |
| 42 | Page 81, Section 2.5, last sentence | Please add the phrase "there may be" to the conclusion regarding "insufficient riparian tree and shrub cover in the LPRSA...." |
| 43 | Page 82, Section 2.6 and Table 2-6 | There is potential for sea turtles to use the saline portion of the Passaic River. Please add sea turtles to the text and table. |
| 44 | Pages 91-96, Table 3-2 | Risk questions (hypotheses) associated with Assessment Endpoints presented on Table 3-2 are in some cases inconsistently worded. Please revise so that all are worded the same. |
| 45 | Pages 93-94, Table 3-2 | Notable for its absence under Assessment Endpoint No.5 is the risk question that considers risks to fish from exposure to sediment-associated contaminants. Benthic fish are likely to be significantly exposed to sediment-associated contaminants via exposure routes involving prey, surface water, porewater, and sediment, yet sediment is not evaluated for the assessment endpoints related to protection of fish. It is recognized that concentrations of contaminants in sediment are difficult to apply to a quantitative evaluation of risks to fish. However, retaining and fully evaluating contaminant concentrations in the whole body of all fish species collected, including carp, is prudent given the strong likelihood of exposure to potentially contaminated sediment for these receptors (the CSM shows ingestion of sediments as a complete and major exposure pathway for benthic fish). The BERA should evaluate contaminant concentrations in all biological tissues collected and analyzed. |
| 46 | Page 95, Table 3-2, Notes | The first footnote indicates that "additional data will be collected on conventional parameters..." Please clarify. In addition, please provide more information to help clarify what is meant by footnote d. |

9

| 47 | Page 104, Section 3.3.2 | The 4th sentence of the last paragraph on this page should be deleted ("Impacts related to urban stress..."). It is making premature and potentially false conclusions. |
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| 48 | Pages 106 to 201, Section 4.2 | The Data Quality Objectives for the BERA dataset specify that the "data must represent current conditions" but the data from the proposed reference and background locations do not all meet this objective. In particular, the proposed estuarine background/reference samples were collected well before 2007, including: sediment chemistry data were collected as early as 1993, sediment toxicity data go back to 1999, tissue chemistry data dates back as far as 1978 and biological survey data go back to 1993.<br><br>More text is needed at the beginning of this section explaining the rationale for including these older data, but that the use of them introduces uncertainty. Then, the uncertainty associated with the use of these data should be explained in Section 7.1, where appropriate. |
| 49 | Pages 172 to 173, Table 4-4 | The table should clarify whether fraction dissolved data for both organic and inorganic contaminants were used in the risk assessment, and some discussion should be added here and possibly in the uncertainty section. |
| 50 | Page 185, Figure 4-30 | Seines were used to capture fish also. Please add the seine locations to the figure. |
| 51 | Page 206, Section 4.3.3.1 | A set of rules should not be used to determine what value to use when multiple values are available. Instead of a set of rules, each value that has multiple results should be evaluated and the most appropriate value should be used. High-resolution methods are not superior to the low resolution method. A table listing the samples with their multiple results, along with a column for rationale of which value is chosen should be included. |
| 52 | Page 207, Section 4.3.3.2 | The rules provided for evaluating the field duplicates and laboratory replicates are generally acceptable; however, for values that fall under the first bulleted rule, a table should be created that shows both values to confirm that the results are not vastly different. If the values are vastly different, then additional text should be provided to explain why averaging the results is valid. |
| 53 | Page 208, Section 4.3.5, third paragraph | The text states that mussel tissue data were normalized by subtracting the final field-exposed mussel concentrations from the control concentrations (Day 0). This approach is unacceptable. The approach should be to report contaminant concentrations at Day 0 and at the end of the exposure period. Please make the necessary corrections. |

| 54 | Pages 211 to 213, Section 5 | The primary objective of a SLERA is to determine if there is a likelihood for ecological impacts based on conservative assumptions and screening values and to determine if a BERA is warranted. The main finding of the SLERA is that a BERA should be completed. The second paragraph on page 211 should be deleted and replaced with the following text: "The primary objective of the SLERA was to provide information to the risk manager to determine one of three options: (1) There is adequate information to conclude that ecological risks are negligible and therefore there is no need for remediation on the basis of ecological risk; (2) The information is not adequate to make a decision at this point, and the ecological risk assessment process will continue to Step 3; or (3) The information indicates the potential for adverse ecological effects, and a more thorough assessment is warranted." This entire section will need to be revised based on comments on Appendix A. |
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| 55 | Page 212, Table 5-1 and Section 5.2 | Carp should be included in this table, specifically as a representative benthic omnivorous fish, and included in the evaluation described in this section. |
| 56 | Page 215, Section 5.4, second paragraph | COIs with screening level HQs greater than or equal to 1, not just greater than 1, should be retained for further investigation in the BERA. This comment also applies to numerous other locations in the draft BERA where HQ > 1 is stated to be the "unacceptable" threshold; the threshold should be HQ ≥ 1. |
| 57 | Pages 216 through 221, Tables 5-2 and 5-3 | Table 5-2 and 5-3 should show the actual screening values that were used for each compound in the SLERA. As noted in the general comments, appropriately conservative values should be used |
| 58 | Page 227, Section 6.1.1, first paragraph, first sentence | The text states that a benthic survey was conducted at 97 locations. Page 257 of the document states that 98 locations were surveyed. Please revise, as appropriate. |
| 59 | Page 227, Section 6.1.1 | Kick net data should be included and discussed in this section, at least qualitatively. |

| 60 | Page 233, Section 6.1.3 | Support for the approach used to identify and eliminate "outliers" from the reference area datasets should be expanded and clarified. As currently written, it appears that any reference area associated with unacceptable results (e.g., toxicity, chemistry) is simply eliminated from the reference area dataset. Clarification is needed, especially regarding the method used to identify outliers. |
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| 61 | Page 243, Table 6-9 and Section 6.1.3.2 | It appears from Table 6-9 that the LPRSA is more contaminated than all reference areas based on all benthic metrics except for Pielou's J', but this is not indicated in the text. Out of 32 measurements, only 7 are similar to LPRSA. The text, graphs, and figures should present consistent information, and discussion of benthic metrics that show significant difference between LPRSA and reference areas should be added to this section. |
| 62 | Page 253, Section 6.1.3.3, first paragraph | The use of a minimum reference value is not appropriate for determining similarity between site and reference areas. Such comparisons should be supported by more rigorous statistical analyses and should not be based on overlapping ranges or comparison of minimum values. Also, the statistical comparison of the six metrics show that only 7 measurements, out of 32, are similar to the LPRSA. This is the information that should be summarized. Delete all references to the minimum reference value. |
| 63 | Pages 257 to 281, Section 6.2 | Statistical summaries of the sediment toxicity data collected for the LPRSA and Jamaica Bay, Mullica, and Dundee Dam (e.g., mean, SD, minimum, maximum, $5^{th}$ percentile, $10^{th}$ percentile, $25^{th}$ percentile, $50^{th}$ percentile, $75^{th}$ percentile, $90^{th}$ percentile, and $95^{th}$ percentile) need to be developed and presented (e.g., in Appendix B). |
| 64 | Page 257, Section 6.2 | Section 6.2 indicates that there are no toxicity data available for the freshwater portion of the Mullica River. Recent samples collected as part of the background/reference data set for Berry's Creek included freshwater toxicity data from the Mullica River. This information should be part of the NOAA database, and it should be included. If it is not available, EPA will provide. Additionally, all of the toxicity data should also be compared to the control data as per previous agreement with EPA. |
| 65 | Pages 261-276, Section 6.2, Table 6-12, Table 6-16 | The minimum survival and biomass for *C. dilutus* in the LPRSA are shown on Table 6-12 to be 16% and 5%, respectively (both control-normalized). Table 6-16 show minimum survival and biomass for *C. dilutus* for the reference area above Dundee Dam to be 71% and 64%, respectively. These results are strikingly different, yet the draft BERA reaches the conclusion of no significant difference for survival and significant difference for biomass, based on statistical analyses. Regardless of statistical differences, there can be no doubt that 16% survival is biologically significantly different from 71% survival. The summary of results (Section 6.2.3.3) fails to recognize the substantial differences in test results that are likely biologically significant, and fails to discuss the locations and sediment chemistry associated with poor test results. Just because toxicity may be localized does not mean it should be ignored. |

12

| | | The draft BERA consistently minimizes localized risk (which may be important for minimally mobile receptors and possibly for identifying contaminant source areas), as shown in the following example from Section 6.2.4, page 280, second paragraph:

*"There is limited risk to the benthic community in the estuarine portion of the LPRSA based on a comparison of LPRSA toxicity test data to the reference datasets. Locations with sediment toxicity outside the reference datasets were highly localized (Figures 6-11 through 6-14) and not representative of the entire LPRSA."*

Finally, *C. dilutus* biomass, which is one of the two most significant toxicity test endpoints and the one with the greatest predictive power (43.5%), is stated in multiple locations in the draft BERA to be highly uncertain, and therefore the results of this important test are relegated to meaningless status. This endpoint should be incorporated into the evaluation. |
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| 66 | Pages 261-262, Section 6.2.2 and Table 6-12 | Sediment toxicity test results are summarized here, with minimum, mean, and maximum statistics presented after control normalization. Very large differences between the minimum and maximum values are apparent (e.g., 3%-96% and 7%-98%), suggesting that the mean values mask the high variability in test results. Given that test organisms represent BMI with minimal mobility, it would be much more informative and meaningful to present sediment toxicity data on a point-by-point basis (i.e., present test results by location, not just by minimum, mean, and maximum calculated for the LPRSA). This preferred approach would allow for risk evaluation on a scale relevant to BMI. |
| 67 | Page 262, Table 6-12 | The *Ampilesca* tests were not run appropriately (renewal vs. static). This needs to be discussed in this section. |
| 68 | Page 262, Section 6.2.3 | Results need to be compared with control data, and the report needs to acknowledge that reference areas "still contain contaminants" even if they are not site-related. This is important for understanding effects data and is the main reason the control data is utilized. |
| 69 | Pages 264-265, Section 6.2.3.2 and Table 6-15 | This section should be called "Comparison with control and reference data" and Table 6-15 should have control data columns. |
| 70 | Pages 275-277, Section 6.2.3.3 | A summary of results cannot be completed without a robust discussion of how the data compare with the control data, and the summary is biased without the inclusion of control and Mullica River data. Please revise this section after adding the control data and Mullica River data to the report. |

13

| 71 | Pages 281-307, Sections 6.3-6.4.3 | These sections contain many erroneous assumptions and calculations and invalid comparisons. The methods used in the line of evidence for sediment, which are further used to support the weight of evidence for the sediment quality triad, are not acceptable. These sections need to be completely revised following an acceptable approach (EPA will provide an example soon). For example, a minimum reference value is used inappropriately, invalid reliability analyses are conducted, and inappropriate weighting of sediment metrics is used. |
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| 72 | Page 281, Section 6.3 | The text states: "...relying solely on NJDEP ESCs for an estimate of benthic risk in the LPRSA is overly protective, given that direct measures of effect (i.e., toxicity, benthic community metrics) are available…. The reliability of the NJDEP ESC values in predicting site-specific toxicity of LPRSA sediment (relative to reference area data) was analyzed."

Please note that, with the notable exception of the screening value provided for 2,3,7,8-TCDD, the NJDEP ESCs are *screening levels* used to identify the potential for risk and the need for further evaluation using more rigorous, site-specific evaluations. However, the selected "direct measures of effect" should be conducted in accordance to approved methods and within the correct context for the study.

The 2,3,7,8-TCDD ESC developed by the USFWS (Kubiak et al., 2007) is given greater weight due to its derivation using site-specific, chemical-receptor paired information from the Newark Bay Complex.

Finally, with the exception of 2,3,7,8-TCDD, the ESCs were never intended to be site-specific.

Additional comments on the use of NJDEP ESCs are provided in relation to Appendix A. |
| 73 | Page 293, Section 6.3.2.4, last bullet | The text references Appendix M of the draft BERA to aid in the justification of the CPG's opinion that benthic life is limited to the top 2 cm of the sediment bed. Review of Appendix M indicates that burrows or tube lengths for a large number of organisms that inhabit the LPRSA, including those most commonly found (polychaete and oligochaete worms), are characterized as deep, moderately deep, or very deep. The text also references the Germano & Associates 2005 report, but provides no further detail as to what conclusions were drawn from that investigation regarding burrowing depths. Therefore, the conclusion that benthic life is limited to the top few cm of sediment is not supported by the evidence provided. The entire document needs to be revised accordingly. |
| 74 | Page 307, Section 6.4.3, last bullet | Please remove this bullet. This conclusion is beyond the scope of this document and is not appropriate. |

14

| 75 | Pages 310-311, Table 6-27 | The UCLs presented for dieldrin and hexachlorbenzene are lower than the means. Please revise, as appropriate. In addition, the table should include a footnote stating how non-detects are handled. |
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| 76 | Pages 315-318, Table 6-28 | There are two additional sources that should be added to Table 6-28 (2,3,7,8-TCDD estuarine):<br><br>a. Wintermyer, M.L. and Cooper, K.R. 2003. Dioxin/furan and polychlorinated biphenyl concentrations in eastern oyster (*Crassostrea virginica*, Gemlin) tissues and the effects on egg fertilization and development. Journal of Shellfish Research 22 (3):737-746.<br><br>b. Wintermyer, M.L. and Cooper, K.R. 2007. The development of an aquatic bivalve model: Evaluating the toxic effects on gametogenesis following 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD) exposure in the eastern oyster (*Crassostrea virginica*). Aquatic Toxicology 81 (1):10-26.<br><br>In addition, the following should be added as a freshwater TRV source:<br><br>c. Chen, J. 2014. Cardiac toxicity by sublethal 2,3,7,8-tetrachlorodibenzo-p-doxin correlates with its anti-proliferation effect on cardiomyocytes in zebrafish embryos. Environmental Toxicology and Chemistry DOI 10.1002/etc.2822. |
| 77 | Page 328, Section 6.5.3.2, first sentence below figure | If no estuarine values are available, use freshwater as a surrogate and discuss in uncertainty section. |
| 78 | Pages 330-331, Section 6.5.4.1 and Table 6-29 | The report should discuss all surface water, not just near-bottom surface water. In Table 6-29, please include a comparison of freshwater and estuarine concentrations. Fresh water values should be used if estuarine do not exist. |
| 79 | Page 332, Figure 6-31 | Please clarify why no data above River Mile 12 are shown and revise as appropriate. |

| 80 | Page 338, Section 6.6.1 | Organic compounds and the bioaccumulation test results should be included in this section. Many more compounds than those listed here should be carried through for this evaluation. Please refer to specific comments on the SLERA and make the necessary revisions throughout the document. |
|----|----|----|
| 81 | Page 347, Figure 6-36 | A similar figure for comparison to control data should be included. |
| 82 | Page 350, Table 6-35 | This table is more appropriate for the FS and should not be included in the BERA. Please delete the table and associated text. |
| 83 | Pages 351-441, Section 7 | Section 7 in its entirety is incomplete and unacceptable because tissue data for all fish species collected are not presented and evaluated (e.g., carp). Regardless of whether a particular species is selected as a focal species, all tissue data need to be presented and discussed. The list of COPECs must be revised based on comments on the SLERA. The SETAC reference provided is fine for the uncertainty section, but it does not supersede EPA guidance. Whole body tissue concentrations should be screened for all compounds. |
| 84 | Page 351, Section 7, last paragraph, fourth sentence | The text states that freshwater benthic omnivorous fish were found in limited numbers. This statement conflicts with information presented in Section 2: *"Large numbers of carp were caught (215 carp, 4.8% of fish caught) between RM 4 and RM 17.4 during the LPRSA fish surveys (Section 2.3)."* Please revise the text for consistency. |
| 85 | Page 353, Section 7.1.1, second sentence | The text states that "Fish tissue COIs included only organic chemicals (other than PAHs)". PAH data are available and should be used. Please revise this section accordingly. |
| 86 | Pages 354-355, Table 7-3, and Pages 357-358, Table 7-5 | These tables include non-target species (e.g., white catfish, white sucker, smallmouth bass, and northern pike), but exclude carp. Carp should be included. |

16

| 87 | Page 357, Section 7.1.2 | The discussion needs to include more detail on the endpoints plotted on the species sensitivity distributions. Given that some endpoints have a greater affinity for adverse biological impacts, this information needs to be provided to ensure that a protective TRV is established. |
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| 88 | Page 359, Table 7-6 | The ACRs referenced as EPA values were derived for surface water, not tissue. There is no evidence that ACRs derived from surface water toxicity testing are applicable to fish tissue TRV derivation. Use of surface water ACRs is inappropriate for fish tissue TRV derivation. An alternate approach might include accessing the USACE ERED database, which presents acute and chronic toxicity data based on tissue residue (whole body, by organ, fillet, etc.) for multiple fish species. For example, the USACE ERED database (Matta et al. 2001) shows that mummichog exposed to MeHg had an LD43 (whole body, mortality endpoint) of 0.46 mg/kg ww. This value can be considered a severe effect endpoint from which a chronic value can be estimated. Even if a conservative ACR such as 3 is applied (as opposed to the more often recommended ACR of 10 for estimating chronic values from acute values), the whole body chronic or estimated low effect value would be around 0.15 mg/kg MeHg, ww. |
| 89 | Page 361, Section 7.1.3.1, 5th bullet | The stated emphasis on "population–level" risks is noted.  However, sublethal impacts on individuals may translate to significant population impacts. Missing from the existing presentation is the important role chemical exposures are known to exert on receptor increased vulnerability to adverse health outcomes in growth, survival, reproduction and disease. Through other studies, several of the key contaminants of concern in the LPRSA have been shown to increase receptor vulnerability to disease and decreased adaption to other stressors in their habitat, (see http://www.epa.gov/ncer/science/endocrine/researchproj.html ).<br><br>At a minimum, this concern should be incorporated into the Uncertainty Section. |
| 90 | Page 362, Table 7-7 | The table lists NOAELs as "not applicable."  This is not true, they are applicable and should be included. |
| 91 | Page 363, Figure 7-1 | This and other similar figures are unclear and need to be revised. The tissue TRV for MeHg is stated to be 0.37 mg/kg (dotted vertical line), based on the 5th percentile of the SSD. The species-specific points on the curve seem to align with the LOAELs discussed in the text, but it is unclear whether these LOAELs are based on acute or chronic exposures. Furthermore, it is unclear whether these LOAELs are the result of the (inappropriate) application of the surface water ACR (3.731). This and similar figures should clearly state whether the SSD is based on acute or chronic exposures. |

| 92 | Page 367, Section 7.1.4.1, first paragraph, first sentence, and Table 7-9 | The text states that "In addition to the focal species, HQs were calculated for three additional species for which LPRSA data were available: smallmouth bass, northern pike, white catfish, and white sucker (Table 7-9)."<br><br>Carp should be included here, and in Table 7-9. |
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| 93 | Page 371, Table 7-11 | Footnote "d" is missing from the table. Please revise. |
| 94 | Page 376, Section 7.2.2.3, last paragraph | The last paragraph on this page should include fish with the worms and crabs. |
| 95 | Page 377, Section 7.2.2.3, last paragraph | The exposure of fish species to multiple areas needs to be evaluated and not limited to just the area in which it was captured. |
| 96 | Page 377, Section 7.2.2.3, Table 7-15 | Mudflats are defined in the document as those areas that are "within -2 ft MLLW and < 6º slope and include all grain sizes." This definition will include gravel areas as mudflats. As such, mudflats should be characterized 2 ways -- one as described in the document currently and one using fine grains only. This comment also applies to Table 8-5. |
| 97 | Pages 385 to 386, Table 7-17 | This table includes a very short list of COPECs, including no dioxin, PCBs, or pesticides. Please revise, as per other comments. |

18

| 98 | Page 387, Table 7-18 | The following mean concentrations appear to be incorrect. Please review/revise as noted below:<br><br>a. Mudflat Areas from LPRSA RM 0 to RM 17.4:<br> - Chromium 120 mg/kg<br><br>b. LPRSA ≥ RM 6:<br> - Chromium 110 mg/kg<br> - Copper 130 mg/kg<br><br>c. LPRSA ≥ RM 8:<br> - Copper 110 mg/kg<br><br>d. LPRSA RM 0 to RM 17.4<br> - Chromium 110 mg/kg<br> - Copper 140 mg/kg |
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| 99 | Page 388, Table 7-19 | Please include all available measured concentrations in fish in this table. |
| 100 | Page 396, Table 7-21 | The lists of COPECs in this table are different from Tables 7-8 and 7-9. Please revise for consistency. |
| 101 | Page 398, Section 7.2.6, sixth sentence | Clarify which specific USEPA document contains the recommendation for metals being used only for screening purposes. |
| 102 | Pages 399-400, Table 7-22 | The same COPECs should be evaluated for all media and species. |
| 103 | Pages 402-403, Table 7-23 | The table should include a footnote stating how non-detects were incorporated into the mean concentration calculations. |

| 104 | Page 405, Table 7-24 | While the estuarine TRV for copper in surface water (5.1 µg/L) may be sufficiently protective of fish, the derivation of this TRV is not transparent. This table shows that for copper the BERA uses an ACR of 2 for deriving the chronic surface TRV for protection of fish, based on acute data for 64 invertebrate species and 20 fish species. It is not clear why (1) invertebrate data are included in the dataset, (2) chronic toxicity data for fish are not used directly, and (3) the ACR of 2 is selected, which is lower than most ACRs presented in the large aquatic toxicity database presented in EPA/4405-84-031 (the 1985 water quality criteria document for copper). Similar questions are (to varying degrees) associated with the derivation of other surface water TRVs. Clear explanation or justification is needed. |
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| 105 | Page 417, Section 7.4.2 | The text should clarify that contaminant concentrations in adult mummichog used to establish or present egg/adult contaminant relationships are based on whole body fish, and not on fillet or organ-specific samples. |
| 106 | Page 419, Section 7.4.3.1 | The TRV for total PCBs in egg tissue (258 ug/kg ww) is approximately five times higher than the total PCB concentration in egg tissue (50.4 ug/kg ww) associated with long-term, apparently multigenerational reproductive effects. The selected TRV is linked to reduced hatchability, while the rejected value (50.4 ug/kg ww, based on a lower dose) is linked to failure to spawn. PCBs are known to contribute to or cause long-term effects in other well-studied receptors (e.g., mink), and rejection of the lower value as an appropriate egg-based TRV is not supported by the information presented. Unless other relevant information suggests otherwise, the 50.4 ug/kg ww value appears to be the most appropriate egg-based TRV for assessing risks to fish. Please revise accordingly. |
| 107 | Page 423, Table 7-30 | There appears to be a typo in this table; please remove the reference to great blue heron and replace with mummichog. |
| 108 | Page 423, Section 7.4.4.3 | Please add the following reference, and details from the study, to this section. A copy of the document has been included. Bugel, S. 2009. An integrated biomarker approach for assessing exposure and effects of endocrine disruptors and other contaminants in killifish (*Fundulus heteroclitus*) from the New York-New Jersey harbor estuary. Rutgers University – Thesis. |

20

| 109 | Page 424, Section 7.4.4.3, first paragraph, third sentence | The following statement is made regarding the high HQ for total PCBs in fish eggs calculated for the background when compared to the HQ for the LPRSA:<br><br>*"Based on these data, concentrations of total PCBs in small fish appear to be greater in Jamaica Bay/Lower Harbor than in the LPRSA and are indicative of concentrations within an urban environment."*<br><br>The elevated HQ that was calculated is more likely linked to the unknown lipid content or a potential source in Jamaica Bay/Lower Harbor. Plausible scientific rationale needs to be provided instead of generalized statements relating results to urban environments. |
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| 110 | Page 433, Section 7.6.3 | The text discusses many stressors that may affect the presence of external and internal anomalies in fish, with the exception of contaminants in sediment. It is well documented that PAHs and other contaminants in sediment cause external lesions in benthic fish, especially ictalurids and carp. Elevated concentrations of contaminants in sediment should be viewed as a primary contributor to the presence of external (and possibly internal) lesions in fish. Please revise the text accordingly. |
| 111 | Page 434, Section 7.7, second bullet at bottom of page | The text states that "risk estimates based on the dietary LOE were not used to determine COCs for fish". This raises the question of why this approach was even considered in the evaluation. As outlined in the Problem Formulation section of the draft BERA, the dietary LOE is an approved approach for evaluating this assessment endpoint. Any risk calculated based on diet should not be ignored, and associated chemicals should be retained as potential risk drivers. Please revise the text accordingly. Tissue should be used for all compounds. |
| 112 | Pages 434-441, Section 7.7 and Table 7-35 | Several chemicals evaluated using different LOEs indicate risk; however, a majority of these chemicals were dropped as COPECs, based in many cases on the uncertainty in the derivation of values using modeled concentrations. Modeling is an accepted and approved approach in evaluating the fish assessment endpoint. It is acknowledged that uncertainty is inherent in modeling and should be discussed; however, it should not be used to eliminate chemicals as COPECs. Please revise the text and table accordingly. |
| 113 | Page 443, Section 8, first bullet | The last statement in this bullet, "use of LPR habitat for breeding used to determine the relative weight for the bird egg measurement endpoint", is not part of the endpoint that was agreed upon and should be deleted. |
| 114 | Page 445, Section 8.1.2.2, Table 8-3 | Please confirm that food ingestion rate for the spotted sandpiper is accurate. Calculations using Nagy 2001 suggest that the value should be 0.034 kg ww/day. |

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| 115 | Page 448, Section 8.1.2.3, Table 8-4 | Risk values using fish of all sizes should be included. For example, great blue herons will eat very large fish and a bounding estimate needs to be presented. In addition, it is unclear why crabs are excluded for the heron. |
| 116 | Page 448, Section 8.1.2.3, Table 8-5 | It is unclear why surface water data is limited to that above RM 8. |
| 117 | Page 454-455, Tables 8-7 and 8-8 | Tables 8-7 and 8-8, and associated text, should include the same compounds for each diet item so that cumulative exposure can be evaluated. Any COPECs that were identified in sediment, surface water, or tissues should be listed on these tables. |
| 118 | Page 454, Table 8-7 | The percent detected and minimum concentration for mercury in fish ≤ 9 cm (RM > 6) listed in the table are incorrect. It appears that the percent detected cell was shifted. The minimum concentration should be 0.033 mg/kg. Please revise accordingly. |
| 119 | Page 462, Section 8.1.3.2, fourth paragraph | The endpoint used in the referenced studies is mortality. Therefore, other developmental and reproductive impacts are not addressed. Characterizing the selected TRVs as an overestimate of risk is considered inappropriate, and therefore should be removed, since potentially important sublethal developmental and reproductive impacts are not considered. This comment also applies to Section 8.1.5.

In addition, the text should refer to ring-necked pheasant, not red-necked pheasant. |
| 120 | Page 468, Table 8-14 | This is the type of table that should be included in the SLERA and BERA for all receptors/pathways/media. |
| 121 | Page 470, Section 8.2.2, paragraph after Equation 8-5 | The text states that prey EPCs were estimated using Equation 8-5 and are represented by whole-body tissue EPCs of each focal species-specific prey species. Equation 8-5 is for deriving bird egg EPCs, which uses the prey EPCs in the calculation. Please revise accordingly. |
| 122 | Pages 470-471, Table 8-15 | Footnote "b" is not in the table. Please revise accordingly. |

22

| 123 | Page 475, Section 8.2.2.2, first paragraph | The biomagnification values used in the calculations were not sufficient. A range of values was provided in the document based on multiple studies. The lowest value, the highest value and a geometric mean of all values should be used to present a range of results. |
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| 124 | Page 478, Section 8.2.3.2 | The LOAEL that was selected was not based upon one of the selected focal species. However, the text indicates a NOAEL could not be selected because there were no values for the selected focal species. As shown in Table 8-11, there are NOAELs available and the value for Forester's tern, as their diet is similar to a kingfisher, should be selected as a NOAEL for this evaluation. |
| 125 | Page 479, Section 8.2.3.2, first paragraph, third sentence | The text states that chicken toxicity data were eliminated from the data used to select dietary TRVs because of the apparent sensitivity of chickens. Elimination of chicken data is inappropriate. While chickens are commonly viewed to be among the most sensitive avian species tested with regard to dioxin-like effects, they are no more sensitive to such effects than several wild bird species tested. Recent studies have shown several common wild bird species to be as sensitive as or even more sensitive to PCBs and dioxins/furans than the well-studied chicken. Only a small fraction of wild birds have been tested with regard to dioxin/furan exposure, so eliminating a sensitive tested species from a small database may not be protective of non-tested (but potentially sensitive) wild species. Furthermore, designating an avian species as sensitive, highly sensitive, etc. is based only on enzyme induction, and may not fully reveal ecologically significant effects or sensitivity to the numerous documented effects that do not fall within the category of "dioxin-like" effects. Chicken data must be included in the candidate data for selecting avian TRVs. While it is acceptable to have a TRV based on chicken and one for non-chicken, and to present both calculations In Section 8.2.4.2, there should be a discussion regarding the potential impact on HQ derivation if chicken data were included in the selection of TRVs. |
| 126 | Page 484, Section 8.2.4.3 | There are several locations in the document where tissue-based comparisons with mummichogs from Jamaica Bay and the LPRSA are made; however, the lipid content from the Jamaica Bay fish is unknown. This should be discussed within the document and information on using an unknown lipid concentration for the comparison should be made (i.e., may over- or under-estimate actual lipid normalized concentration). |
| 127 | Page 485, Section 8.3 | The list of COPECs will need to be revised based on comments contained herein, particularly those on the SLERA. |

| 128 | Page 486, Table 8-23 | The great blue heron has an egg HQ > 1 for total TEQ, indicating that chemicals contributing to total TEQ should be identified as COCs for avian receptors represented by great blue heron. Use of a species-specific TRV to reduce the HQ is meaningless as the selected TRV should be representative of a particular feeding guild or trophic level represented by great blue heron; protection of this species specifically is not the intent. Reducing the SUF to < 1 for great blue heron is also inappropriate because avian receptors that it represents are likely to forage wherever prey and cover are found. Therefore, Tables 8-23 and 8-24 should identify total TEQ as a COC for great blue heron. Additionally, the prey items for the great blue heron and belted kingfisher are larger, and contain higher concentrations of contaminants, than the prey items for the spotted sandpiper. Given this, it is likely that their exposure and therefore their risk is greater. This should be discussed in the text. For transparency issues, all of the avian receptors that were evaluated should be included in Table 8-23. |
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| 129 | Page 493, Section 9.1.2.3 | Section 9.1.2.3 of the document should be modified to address the comments on Table 9-4. |
| 130 | Page 494, Table 9-4 | The labels for the evaluation completed for the mink based on prey composition need to be clarified. There are two scenarios that should be evaluated: (1) Mink – aquatic prey only with blue crab at 33.5% and fish at 66.5%, and (2) Mink – aquatic and terrestrial prey with blue crab at 16.5%, fish at 34%, and terrestrial prey at 49.5%, with the terrestrial portion being set to zero as there is no terrestrial prey contaminant data. A third scenario, termed Mink – aquatic prey with estimated terrestrial prey using blue crab at 16.5%, fish at 34%, and terrestrial prey at 49.5%, with the terrestrial concentration being equivalent to the fish concentration, may be included if desired. |
| 131 | Page 494, Section 9.1.2.3 | All fish sizes should be included in the mink diet composition as the mink is able to catch all sizes of fish and it is able to prey/scavenge fish that wash up on the shore. It is acceptable to have multiple calculations showing the potential risk for all fish, a subset based on sizes, and a distribution of risk by size. |
| 132 | Page 497, Section 9.1.2.4 | White sucker, carp, channel catfish and brown bullhead should all be included. |
| 133 | Pages 498-499, Table 9-7 | Please make the following revisions:a. The mean concentration for selenium in bass ≤ 30 cm (site wide) should be 0.62 mg/kg.b. The total number of samples for white perch ≤ 30 cm (site wide) should be 22. It appears that the sample LPR1-MAWB-Ind145 was excluded from the calculation. |

24

| 134 | Page 509, Table 9-13 | The footnote to Table 9-13 indicates an FIR of 0.16 was used for mink TRV extrapolation (from dietary TRV, Chapman 2003). Table 9-3 shows an FIR of 0.14 was used for mink. It appears that 0.16 is the upper limit of the range indicated in footnote "d" in Table 9-3. Please add clarification to the text and tables. |
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| 135 | Page 512, Section 9.1.4.2, bullets | In the 5th bullet, please provide the rationale for the assumption that only 50.5% of the mink diet comes from the LPRSA. In the 6th bullet, consider evaluating differences in fish size. In the 8th bullet, please clarify what crab data were used, and check for consistency throughout the document. |
| 136 | Page 522, Section 9.1.4.2 | Future use and restoration activities should be considered in the text. |
| 137 | Page 523, Section 9.1.4.3, first paragraph | Please provide additional rationale for using fish values as a surrogate for blue crab. The last sentence is not sufficient. Explanation is needed regarding whether this approach is supported by the LPRSA data (i.e., are concentrations from fish less than 30 cm similar to blue crab concentrations?). |
| 138 | Pages 523-524, Table 9-18 | As was discussed in a previous comment, lipid content from the Jamaica Bay fish samples is unknown. This should be discussed within the document and information on using an unknown lipid concentration for the comparison should be made (i.e., may over- or under-estimate actual lipid normalized concentration). |
| 139 | Page 525, Section 9.1.6 | The summary will need to be revised, based on the comments received. |
| 140 | Page 530, Section 11 | Recommend that the conclusion state that due to a lack of TRVs for herptiles, the potential risk and impact to herptile populations is unknown. |
| 141 | Page 532, Section 13 | This entire section will need to be revised to reflect the changes made to the rest of the document. |
| 142 | Pages 533-535, Table 13-1 | This table should present all unacceptable risks (HQ > 1) regardless of LOE or weighting of various LOE. As currently presented, there is too much interpretation in the conclusions reached, and the ecological significance of potentially important risk estimates is minimized (i.e., "low likelihood of impact") due to various choices or assumptions made in the draft BERA. These include selection of TRVs, elimination of receptor species from full evaluation, application of uncertainties, designation of some LOE as weak, low weighting applied to LOE, use of unsupported categories of risk (e.g., low, moderate, or high likelihood of risk), and the effect of non-chemical stressors on ecological receptors. This comment also applies to any similar text in Section 13 of the draft BERA. |

| 143 | Appendix A - SLERA, General | Several chemicals are eliminated as COPECs in various media (sediment, surface water, and tissue) due to a lack of screening levels and TRVs. This approach is inappropriate and these chemicals should be retained for further evaluation in the BERA. |
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| 144 | Appendix A - SLERA, General | The SLERA should not reference the BERA at all, except at the end to say that a BERA is needed. |
| 145 | Appendix A - SLERA, General | While reviewing the document, it is not clear which values were used for screening. This needs to be modified. |
| 146 | Appendix A - SLERA, General | Chemicals should not be screened out based on species. The maximum detected concentrations should be used for each compound during the SLERA screening. Specific species can be examined in the BERA, as appropriate. |
| 147 | Appendix A - SLERA, General | Carp must be included in the SLERA. The arguments presented for not including carp in the draft SLERA (and the draft BERA) are unacceptable. It is irrelevant whether carp are introduced or native, are considered a stressor, or are considered too large for upper trophic level receptors to consume. In many locations, carp are often caught by humans and either consumed or disposed of on the bank, where they are available to receptors such as raccoons, mink, and avian carnivores. Furthermore, carp likely represent the most highly exposed fish taxon, and eliminating carp from the analysis results in a loss of important exposure data.

The SLERA and BERA should be revised to incorporate carp in the analysis. |
| 148 | Appendix A - SLERA, General | Significant modification is needed to the SLERA, and these modifications must be carried through to the BERA. Substantial revisions are needed to provide the most conservative exposure and toxicity parameters, as required by ERAGS, to ensure that the SLERA provides defensible conclusions and that potential ecological threats are not overlooked. Conservative effects thresholds must be used in the assessment (i.e., NOAELs). Estimates of exposure must be generated using comprehensive data on the site and conservative assumptions regarding exposure (e.g., area use factor of 100%, bioavailability of 100%, most sensitive life stage, minimum body weight to maximum ingestion rate, 100% of diet consists of the most contaminated dietary component, highest bioaccumulation factor reported in the literature, etc.). |
| 149 | Appendix A - SLERA, General | Hazard quotients need to be calculated for each contaminant and HIs need to be calculated for groups of contaminants with the same or similar mode of toxicity. |

26

| 150 | Appendix A - SLERA, General | "Uncertain" COPECs must be included in the list of COPECs that will be evaluated in the BERA. |
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| 151 | Appendix A - SLERA, General | The objectives identified in the SLERA are not consistent with EPA guidance (EPA, 1997; EPA, 1998) and must be revised; they included identification of substances that can be eliminated from further consideration because they are unlikely to pose risks to ecological receptors, identification of contaminants of potential ecological concern (COPECs) that warrant further consideration in the BERA, and identification of chemicals that will be addressed in the BERA uncertainty section. A SLERA should not identify COPECs that will be addressed in the uncertainty section of a BERA. Conservative toxicity screening values (TSVs) are used in a SLERA to identify contaminants and exposure pathways that might pose ecological threats. If no TSVs are available for a substance, then that substance is carried into the BERA. In the BERA, less conservative toxicity reference values (TRVs) are typically used to identify the substances that are causing or substantially contributing to ecological risks. If TRVs are not available or cannot be developed for certain COPECs in the BERA, they are identified as uncertain COPECs in the BERA (not during the SLERA). |
| 152 | Appendix A - SLERA, General | To provide some context, the SLERA should include a summary of the problem formulation and diagrams that illustrate the conceptual site model. |
| 153 | Appendix A - SLERA, General | The SLERA should present the assessment and measurement endpoints that are relevant to the SLERA, not those that are developed for the BERA. Table 1-1, Summary of BERA Assessment and Measurement Endpoints and Data Used for the SLERA, should be revised so that it describes SLERA assessment and measurement endpoints rather than BERA endpoints. The SLERA should use conservative screening values (e.g., use of bivalve-specific screening values is inappropriate in Table 1-1, Assessment Endpoint 4). |
| 154 | Appendix A - SLERA, General | Where concentrations in tissue will be compared to a critical tissue residue (CTR; e.g., in Table 1-1), that value should be provided. |
| 155 | Appendix A - SLERA, General | Ecological receptor groups and focal species should not be identified in the SLERA (i.e., Table 1-2, Summary of Ecological Receptors and Focal Species for the LPRSA BERA, should be eliminated from the SLERA) since the TSVs used are generic and broadly applicable to aquatic organisms and aquatic-dependent wildlife. |
| 156 | Appendix A - SLERA, General | According to EPA guidance (EPA, 1997; EPA, 1998), chronic no observed adverse effect levels (NOAELs) should be used as a screening ecotoxicity value when they are available. When chronic NOAELs are not available but a chronic lowest observed adverse effect level (LOAEL) is available, the screening ecotoxicity value should be estimated by multiplying the chronic LOAEL by 0.1. It appears that this guidance was not followed for all COPECs and all media types. The following |

27

| | | concerns are noted based on a cursory evaluation of the selected TRVs (additional exceptions are likely to be identified based on a more in-depth analysis): |
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| | | **Surface Water TRVs** – The EPA criterion continuous concentration (CCC) for chromium-VI should be selected for total chromium because total chromium could be primarily in the Cr-VI form; the EPA CCC for lead should be used for lead in the freshwater and marine areas; the EPA CCC of 8.2 µg/L should be used for nickel in the marine areas; the EPA CCC of 5.0 µg/L should be used for selenium in the freshwater areas; alternative TRVs should be selected for silver; the EPA criterion maximum concentrations (CMCs) that were selected represent acute toxicity thresholds; the EPA CCC of 0.072 µg/L should be used for TBT in the freshwater areas.<br><br>**Sediment TRVs** – NJDEP freshwater and marine "high" and "low" screening level (SL) values are presented in Attachment A2; the source of these SLs should be identified in the table; unless the NJDEP "high" SL values represent NOAELs, they should be removed from the SLERA; there are numerous candidate sources of TRVs for freshwater and marine sediments. The SLERA should compile candidate TRVs for each COPEC and provide a rationale for selecting one for use in the SLERA; the source of the marine SL values for plants is not identified in Attachment A2 so it is not possible to evaluate the appropriateness of these SL values. However, a plant-specific screen should not be included in the SLERA; risks to plants associated with exposure to contaminants should be assessed in the BERA.<br><br>**Tissue TRVs** – NOAELs for invertebrates, fish, birds, and mammals have not been estimated for many of the substances included in the screening table for invertebrates, fish, birds, and mammals; the screens for invertebrates, fish, birds, and mammals are therefore incomplete. |
| 157 | Appendix A - SLERA, General | The "Notes" for several tables (e.g., 4-9, 4-10, 4-12, 4-13, and 6-2) state that the majority of the total mercury in fish and invertebrate tissue is in the form of methylmercury. It is important to clarify that for lower trophic level fish and invertebrates, methylmercury is typically only slightly above 50% of the total mercury. |
| 158 | Appendix A - SLERA, General | The screening tables for water and tissues were not examined in detail. However, based on the review of the screening tables for sediments, it is likely that the screening for these media will need to be revised to correct errors and omissions. |
| 159 | Appendix A - SLERA, General | Hazard indices (HIs) need to be calculated for all groups of contaminants with the same or similar modes of toxicity (e.g., HIs were not calculated for divalent metals, PAHs, etc.). |

28

| 160 | Appendix A - SLERA, Page 4, Table 1-1, Assessment Endpoint 4, first Measurement Endpoint | Text should be added to state that chemical concentrations in tissue from in situ caged bivalves will be compared with literature-based CTRs. |
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| 161 | Appendix A - SLERA, Page 7, Table 1-1 | Endnote 'b' states that a dietary model will be used for contaminants that may be metabolized or regulated by the fish. If tissue concentrations were measured in the fish, then these concentrations should be compared to the appropriate TRV. Dietary models should be used for all COIs, not just those considered "regulated/metabolized."Endnote 'g' states that surface sediment data were not used in the screen for amphibians and reptiles because TRVs were not available. The exposure to contaminants in the sediment still needs to be evaluated as per Figure 1-1 (p. 12). |
| 162 | Appendix A - SLERA, Page 9, Table 1-3 | Sediment chemistry should be added as a 'type of data' for fish, birds, mammals and herpivores, as they will be subject to inadvertent sediment ingestion. In fact, text (p. 16) and Table 3-1 (p. 30) states that the incidental sediment ingestion dietary component will be used in dose calculations for fish, macroinvertebrates, birds, and mammals. More specifically, Table 1-3, Ecological Receptor Groups and Types of Data Used for COPEC Identification in the SLERA, is incomplete and should also include the following:<br>a. Sediment chemistry data should be used to assess potential risks to benthic fish.<br>b. Fish egg tissue chemistry data should be used to assess potential risks to fish (e.g., for PCDDs/PCDFs, PCBs, selenium, etc.),<br>c. Sediment chemistry data should be used to assess potential risks to sediment-probing birds,<br>d. Sediment chemistry data and dietary dose should be used to assess potential risks to amphibians, and<br>e. Dietary dose should be used to assess potential risks to reptiles. |
| 163 | Appendix A - SLERA, Page 12, Figure 1-1 | Figure 1-1, Decision Points Considered in the SLERA, should be revised to be consistent with EPA guidance (EPA, 1997; EPA, 1998). The SLERA should include a selection of conservative TSVs (chronic no observed effect levels), development of exposure estimates (EPCs), and calculation of hazard quotients. It is not appropriate to eliminate any receptor-exposure pathway pair based on lack of empirical data, lack of a TRV, or lack of alternative methods for evaluating risks. In addition, receptor-exposure pathway pairs cannot be eliminated in the SLERA based on generic rationale regarding limited potential for bioaccumulation; all such receptor-exposure pathway pairs must be carried forward into the BERA and evaluated. |

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| 164 | Appendix A - SLERA, Page 15, Section 2.1 | The sediment chemistry data used in the SLERA that are identified in Section 2.1, Data Availability and Selection, are different from those presented in Table 1-1 (the 2008 coring data are not identified in Table 1-1). |
| 165 | Appendix A - SLERA, Page 16, Section 2.1 | Text states that surface sediment data collected from all dredge locations (RM 10.9 and Lister Ave dredge area) were excluded. This statement appears to conflict with other text (e.g., pp. 15 and 26), which specifically includes RM 10.9 data. Please revise for consistency. |
| 166 | Appendix A - SLERA, Page 16, Section 2.1.1 | The definition of "mudflat areas" used in Section 2.1 (and Section 3.2.2.1, Body Weight and Ingestion Rates) is inappropriate; any unvegetated intertidal areas that are comprised of fine grain sediment (mud) should be considered "mudflat areas" for the purposes of the risk assessment. Intertidal areas including larger grain size sediment should be evaluated separately.<br><br>Table 2-1 should be modified to reflect this comment. |
| 167 | Appendix A - SLERA, Pages 16-17, Sections 2.1.1 and 2.1.2 | In Sections 2.1.1, Sediment Data, and 2.1.2, Surface Water Data, it is unclear what screening values will be used to evaluate the sediment and water between RMs 4 and 8 (p.16, second sentence of second to last paragraph, and p. 17, last paragraph, respectively). In Section 3.2.1, Tissue, Sediment, and Surface Water (first paragraph, last sentence), it is stated that marine values were used for RMs 0-8 and freshwater values were used for RMs 4-17.4. In the SLERA, areas that transition between fresh and salt water should be screened against the lower of fresh and marine thresholds. |
| 168 | Appendix A - SLERA, Page 18, Section 2.1.3 | In Section 2.1.3, clarify why no surface water samples are included for RMs 12-17.4. Table 2-2, Number of Surface Water Samples, should be revised using all available data. |
| 169 | Appendix A - SLERA, Page 18, Table 2-2 | The table indicates that 2 surface water samples were collected between RM 8 and RM 10. According to the SV-CWCM summary report, no samples were collected between these RMs. Please revise the text and table accordingly. |
| 170 | Appendix A - SLERA, Page 19, Table 3-2 | Table 3-2, Summary of Fish and Invertebrate Tissue Used in SLERA, should be labeled, "Table 2-3." |

30

| 171 | Appendix A - SLERA, Page 20, Table 3-2 | Table 3-2 [sic] in Section 2.1.3, Tissue Data, footnotes "h" and "i" inappropriately state that American eel tissue data and carp tissue data, respectively, will only be evaluated in the Human Health Risk Assessment; American eel and carp tissue must both be included in the Ecological Risk Assessment. |
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| 172 | Appendix A - SLERA, Pages 23-26, Section 3 and Figures 3-1 through 3-3 | The methods that are described in Section 3, Screening Methods, and summarized in Figures 3-1, Surface Sediment COPEC Screening Process; 3-2, Surface Water COPEC Screening Process; and 3-3, Tissue COPEC Screening Process, for identifying COPECs are not appropriate. Specifically:<br>a. Contaminants (in sediment, water, or tissue) cannot be eliminated if they are not detected in any sample unless the available non-detect data for each COI is first compared to the selected TSV. If the detection limit is greater than the selected TSV, the contaminant cannot be excluded.<br>b. Frequency of detection should not be used as a criterion for retaining or eliminating contaminants in the SLERA.<br>c. The spatial distribution of detected contaminant concentrations should not be used to reduce or eliminate contaminants in the SLERA.<br>d. The lack of a TSV should not be used to identify contaminants that need to be discussed in the uncertainty section of the BERA; those contaminants should be retained and evaluated in the BERA. If a TRV cannot be identified or derived during the BERA evaluation, then such COPECs need to be discussed in the uncertainty section of the BERA. |
| 173 | Appendix A - SLERA, Page 24, Figure 3-2 | There appears to be a typo in Figure 3-2. Tissue samples are referenced. Please clarify. |

31

| 174 | Appendix A - SLERA, Page 26, Section 3.1; Page 56, Section 4.2.2; and Attachment A3, page 13 | For fish and invertebrate whole body tissue, metals (other than mercury, methyl mercury, selenium, and butlytins) were immediately culled from the SLERA/BERA without being identified as whole-body tissue COIs and without screening. Additionally, PAHs were not identified as whole body tissue COIs for fish. The rationale is presented on p.13 of Attachment A3 and pp. 26 and 56 of the SLERA, and is based on regulation/metabolism by invertebrates and fish of these contaminant classes.<br><br>a. The bioaccumulative nature of inorganics is addressed in EPA 2000, Table 4-2, which states the following metals are considered important bioaccumulative compounds: Arsenic, Cadmium, Chromium VI, Copper, Lead, Methyl Mercury, Nickel, Selenium, Silver, and Zinc. The fact that tissue residue effects levels are available for metals further validate the need for appropriate screening, and conservative tissue TRVs should be selected.<br><br>b. PAHs should remain as a COI if present in adult whole body tissue and evaluated using appropriate CBRs. In addition, unmeasured ecotoxic PAH metabolites are expected to be present and contributing to body burden. Therefore, adverse effects from PAHs and their metabolites to adult and early life stage fish should be further discussed in the uncertainty section. |
| 175 | Appendix A - SLERA, Page 26, Figure 3-4 | A reference for footnote a on Figure 3-4 needs to be provided. |
| 176 | Appendix A - SLERA, Page 27, Section 3.1, first paragraph, last sentence | Please clarify why dietary LOE was used instead of tissue LOE. Tissue LOE should be used for all compounds detected. |
| 177 | Appendix A - SLERA, Page 27, Section 3.1 | Dietary COIs for fish are limited to metals and PAHs (i.e., those contaminants that the SLERA states could not reliably be assessed through the screening of tissue residues). Fish tissue residues and dietary exposure represent discrete risk questions/lines of evidence and each must be evaluated for all COIs via separate Assessment and Measurement Endpoints. All prey tissue COIs (not limited to metals and PAHs) should be used for dose estimations for corresponding fish feeding guilds and screened against conservative NOAEL dose-based TRVs. |

| 178 | Appendix A - SLERA, Page 29, first bullet | At the top of the page, please clarify why the concentration in surface water is listed as being from RM 8 to RM 17.4. |
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| 179 | Appendix A - SLERA, Page 29, Table 3-1 | The average value for eel weight is listed as 0.052 kg. Considering that many juvenile eels were caught in the northern portion of the LPRSA, these juveniles may skew the population size downward (i.e. the average weight of the eels caught in the October 2012 sampling effort was 0.2192 kg, an order of magnitude greater that the overall reported average). Therefore, eels should be separated into two classes: juvenile and adult, with each having their own average weight, etc. |
| 180 | Appendix A - SLERA, Page 29, Table 3-1 | The type of dietary exposure calculations identified for each focal species (Table 3-1, Sources of Dietary Dose Exposure Parameter Data) would normally be conducted in the BERA rather than the SLERA (but with less conservative EPCs); the rationale for conducting this type of detailed screening is not provided, but should be presented so that the reader understands why the screen is being conducted at the focal species level. The use of average values (Table 3-1) is not appropriate in the SLERA; the purpose of the SLERA is to use values that will result in the highest likelihood of capturing potential effects. |
| 181 | Appendix A - SLERA, Pages 31-32, Section 3.2.2.2 and Table 3-2 | Prey composition of receptors ingesting invertebrates as described in Section 3.2.2.2, Prey Composition, and in Table 3-2, Prey Types Evaluated in the Dietary Dose for Each Receptor, relies on existing data from the river (worms, crabs, etc.). Assuming that the diet of mummichog and other invertivorous fish is comprised of worms alone may underestimate exposure. Grass shrimp, amphipods, and other invertebrates that make up the majority of the diet of invertivorous fish may contain higher concentrations of some contaminants than worms. This issue should be discussed with regards to potentially under-estimating the risk in the uncertainty section. |
| 182 | Appendix A - SLERA, Page 32, Equation 3-3 | The following equation is used for the estimation of fish egg concentration is $C_{egg} = C_{adult} \div CF$ (aka BMF).   Please provide the basis of the BMF calculation so that the appropriateness of this formula can be assessed. |

33

| 183 | Appendix A - SLERA, Pages 32-34, Section 3.2.3 | No COPEC-receptor pairs should be screened out in the SLERA based on egg tissue concentrations. Mummichog egg tissue COPEC concentrations were estimated using inappropriate adult-to-egg conversion factors and an unsubstantiated estimate for egg hardening. For PCBs, PCDDs/PCDFs and OC Pesticides, more appropriate CFs based on multiple species and more data are available in Russell et al. (1999) rather than Niimi (1983) and Tietge et al. (1998). For mercury, egg concentration is related to maternal diet so it is not appropriate to use any conversion factor. There is uncertainty that conversion factors that are not validated using data on mummichog or evaluated using lipid data for adults and eggs would result in reasonable egg tissue concentrations. No basis is provided for the 2-3 fold increase in weight of unfertilized eggs due to hardening in the reference provided; rather Lahnsteiner (2000) shows weight increase during hardening of only about 22% of egg weight for rainbow trout. |
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| 184 | Appendix A - SLERA, Page 34, Table 3-4 | Higher avian biomagnification factors (BMFs) for mercury than those presented in Table 3-4, Avian BMFs, can be calculated using data from other sources (Atwell et al. 1998; Bargagli et al. 1998). In the absence of site-specific data to validate the assumed avian BMF for mercury, mercury should not be screened out in the SLERA based on estimated bird egg concentrations. |
| 185 | Appendix A - SLERA, Page 34, Section 3.3 | According to the information presented in Section 3.3, the SLERA "TRVs" (which would more clearly be called toxicity screening values [TSV] to distinguish them from the TRVs used in the BERA) are presented in Attachment A3. However, this attachment does not appear to be complete. The USEPA-recommended TRV tables are included in Supplement A3-1 and the TRV working database is presented in Supplement A3-2. However, the list of TRVs for water, sediment, and tissues that were used in the SLERA does not appear to be presented in Attachment A3. A series of tables that present the SLERA TRVs (TSVs) that were used in the assessment needs to be included in the document along with the rationale for their selection that describes a hierarchical approach to the selection of SLERA TRVs (TSVs). |
| 186 | Appendix A - SLERA, Page 35, Section 3.4 | At no point in the SLERA is there any mention that sediment data used in the screening evaluation were normalized to organic carbon content. Instead, the SLERA text refers readers to Attachment A2, which presents the HQs calculated for each LOE and states that the results were normalized. At the SLERA stage, OC-normalized data should not be used in the refinement of COPECs, and use of these data for the BERA is even questionable. The SLERA should be revised to reflect the evaluation of non-OC-normalized data, and those results should be carried forward in the BERA. |

34

| 187 | Appendix A - SLERA, Page 37, Table 4-1 | Aroclor 1268 has an 'a' footnote. This footnote pertains to metals. Clarification is needed.<br><br>In addition to the listed, individual, PCDDs/PCDFs (i.e., the 17 World Health Organization [WHO] congeners assigned Toxicity Equivalence Factors [TEFs]), sediment should also be evaluated on the basis of the PCDDs/PCDF mixture, commonly referred to as the dioxin (TCDD) toxicity equivalence (TCDD-TEQ) of a sample. This represents the sum of adjusted dioxin/furan congener concentrations using congener-specific TEFs. In addition for use in tissue, this approach is also used to generally characterize sediment potential toxicity because chlorinated dioxins and furans are typically found as a mixture comprised of similar congeners (structure and related toxicity), and these are assessed in relation to 2,3,7,8-TCDD, the most studied, and considered the most toxic congener, of this group. |
| 188 | Appendix A - SLERA, Page 40, Table 4-2 | PCDDs/PCDFs lists 2,3,7,8-TCDD; however, the TEQ (sum) is not listed. Sediment should also be evaluated for dioxin TEQ (as explained above). Alpha-BHC and beta-BHC have a 'c' footnote. This footnote pertains to PCBs. Clarification is needed. |
| 189 | Appendix A - SLERA, Page 44, Table 4-5 | There is a footnote 'a' pertaining to chlordane; however this footnote is not used in the table. Clarification is needed. Additionally, as per NJDEP's EETG section 5.4, the investigator is not precluded from proposing sediment ESC for contaminants without an ESC on the NJDEP table. Contaminants with high frequency of detection but lacking ESC should be carried through the risk assessment process. |
| 190 | Appendix A - SLERA, Page 45, Section 4.1.2 | It is not clear why dissolved and total concentrations were screened for some metals, while only dissolved concentrations were screened for other metals; all of the data for metals in surface water (i.e., total and dissolved concentrations) should be screened to identify the COPECs that need to be evaluated in the BERA. |
| 191 | Appendix A - SLERA, Page 45, Section 4.1.2 | Screening-level TRVs are available for total metals in freshwater and in marine waters (e.g., CCME water quality guidelines). Alternative screening-level TRVs should be used when EPA water quality criteria are not available for contaminants in freshwater or marine waters. |
| 192 | Appendix A - SLERA, Page 46, Table 4-6 | PCDDs/PCDFs list the 17 WHO dioxin and furan congeners; however, the TEQ (sum) is not listed. Surface water should also be evaluated for dioxin TEQ. |

| 193 | Appendix A - SLERA, Pages 47-48, Table 4-7 | Several chemicals are excluded from further evaluation due to a lack of marine screening levels. It is recommended that surrogate values be used in the absence of marine screening levels, even if they are freshwater values. In addition, it is unclear why those chemicals shown in Table 4-7 as having no screening value are not the same as those shown in Table 4-8. Please revise the tables and make the necessary corrections. |
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| 194 | Appendix A - SLERA, Page 48, Table 4-7 | PCDDs/PCDFs lists 2,3,7,8-TCDD; however, the TEQ (sum) is not listed. Surface water should also be evaluated for dioxin TEQ. |
| 195 | Appendix A - SLERA, Page 49, Section 4.1.2 | Bullet PCDDs/PCDFs rules out all but 2,3,7,8-TCDD due to lack of surface water thresholds; however, the TEQ (sum) should also be evaluated for dioxin. |
| 196 | Appendix A - SLERA, Page 50, Table 4-8 | Surface water contaminants cannot be eliminated during the SLERA based on the lack of a screening-level TRV; contaminants listed in Table 4-8 must be included as COPECs for evaluation in the BERA. |
| 197 | Appendix A - SLERA, Page 50, Table 4-8 | PCDDs/PCDFs list the 17 WHO dioxin and furan congeners; however, the TEQ (sum) is not listed. Surface water should be also be evaluated for dioxin TEQ. Additionally, as per NJDEP's EETG section 5.4, the investigator is not precluded from proposing surface water ESC for contaminants without an ESC on the NJDEP table. For example, it is stated (p. 49) that cis-1,2 dichloroethylene is present in 96% of surface water samples, but is culled from the SLERA due to lack of a screening criterion or standard. Contaminants with high frequency of detection but lacking ESC should be carried through the risk assessment process. |
| 198 | Appendix A - SLERA, Page 52, Table 4-9 | PCDDs/PCDFs list individual dioxins and furans; however, the TEQ (sum) is not listed. Invertebrate tissue should be evaluated for dioxin TEQ. |
| 199 | Appendix A - SLERA, Page 56, Section 4.2.1 | The document lists estuarine water from RM 0-8 and freshwater from RM 4-17.4. This is inconsistent. Clarification is needed. |

36

| 200 | Appendix A - SLERA, Page 63, Table 4-13 | The white sucker LOAEL has a 'b' footnote for total PCBs; however, footnote 'b' pertains to NOAEL. Clarification is needed. |
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| 201 | Appendix A - SLERA, Page 66, Section 4.2.3; Attachment 3, Page 45, Section 5.3, Fish Diet | Dietary COIs are limited to metals and PAHs, i.e., those contaminants that the SLERA states could not reliably be assessed through the screening of tissue residues. Fish tissue residues and dietary exposure represent discrete risk questions/lines of evidence and each must be evaluated for all COIs via separate Assessment and Measurement Endpoints. All prey tissue COIs (not limited to metals and PAHs) should be used for dose estimations for corresponding fish feeding guilds and screened against conservative NOAEL dose-based TRVs. |
| 202 | Appendix A - SLERA, Page 70, Table 4-17 | Table 4-17 should show screening values, screening concentration and HQs, not just an "x" in a box (for all media). |
| 203 | Appendix A - SLERA, Page 70, Table 4-17 | The table indicates an exceedance of the LOAEL for total TEQs in the belted kingfisher model. Review of Attachment A2 indicates an HQ of 0.89. Please revise accordingly. |
| 204 | Appendix A - SLERA, Page 74, Section 4.4 | All fish sizes should be used for the SLERA. |
| 205 | Appendix A - SLERA, Page 77, Section 4.6 | The document states that reptiles are only expected in freshwater portions of the river; however, turtles would be expected in the lower four miles of the LPRSA. Reptiles should be added to the estuarine portion of the river. |
| 206 | Appendix A - SLERA, Page 87, Section 6 | Dioxin is not listed for benthic invertebrate tissue or fish dietary dose. Dioxin has been inappropriately culled from the SLERA for these receptors/exposure pathway and must be evaluated for both. |

37

| 207 | Appendix A - SLERA, Page 87, Section 6, first bullet | The text indicates that 11 OC pesticides were retained as COPECs for benthic invertebrates. Table 4-2 shows 14 and Table 6-1 shows 12. Please revise to ensure consistency.The text also states that PCB TEQs, PCDD/PCDF TEQs, and total TEQs were retained as COPECs; however, they are not included in Table 6-1. Please revise the text and table to ensure consistency. |
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| 208 | Appendix A - SLERA, Attachments A1 and A2 | The detailed exposure assessment for surface water and tissues that is presented in Attachment A1 was not reviewed to determine if the maximum reported contaminant concentrations matched the results presented in Attachment A2, but based on the number of deviations that were noted for sediment, Attachments A1 and A2 need to be reviewed and evaluated to ensure that the correct EPCs are used in the SLERA. |
| 209 | Appendix A - SLERA, Attachment A2 | Amphibian-specific TRVs are presented in Attachment A2 (COPEC screening tables). There is no reason to include amphibian-specific TRVs in the SLERA; an evaluation of risks to amphibians should be included in the BERA. The amphibian-specific screen needs to be removed from the SLERA. |
| 210 | Appendix A - SLERA, Attachment A2 | The tables presented in Attachment A2 need titles. |
| 211 | Appendix A - SLERA, Attachment A2 | The results of the sediment screen are presented in Attachment A2 of the SLERA but the maximum concentrations of contaminants in these tables do not always agree with the summary tables presented in Attachment A1. Please review for consistency and revise as appropriate. Note that Table 4-2 cannot be used as a basis for identifying the sediment COPECs for benthic invertebrates that need to be evaluated in the BERA. |
| 212 | Appendix A - SLERA, Attachment A3, Page 8 | The text under TRV acceptability criteria, second bullet, states that TRVs should represent "NOAEL and/or LOAEL concentrations or doses." As per ERAGs, section 1.3.1, screening ecotoxicity values should represent a NOAEL for chronic exposures to contaminants to ensure that risk is not underestimated. TRVs used in the SLERA should be reevaluated/revised as appropriate. |
| 213 | Appendix A - SLERA, Attachment A3, Page 9 | The text under TRV acceptability criteria, second bullet, states that avian TRVs based on domesticated species, such as chickens or Japanese quail, will not be used (unless no other data are available). This approach is unacceptable because use of the most conservative NOAEL available is appropriate in a SLERA. TRVs used in the SLERA should be reevaluated/revised as appropriate. |

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| 214 | Appendix A - SLERA, Attachment A3, Page 10 | Text states that if no NOAEL is available from the same study from which the LOAEL was obtained, no screening level NOAEL was selected. As per ERAGS, section 1.3.1, it is standard practice to multiply the LOAEL by 0.1 and use the product as the screening ecotoxicity value. TRVs used in the SLERA should be reevaluated/revised as appropriate. |
| 215 | Appendix B, SRC | Reported sediment toxicity test results in Appendix B are not identified to determine whether they are raw toxicity test results, batch-wise control-normalized toxicity test results, toxicity test results normalized to other control or reference results.  As a result, it is not possible to evaluate the appropriateness of the toxicity data used in the Spearman Rank Correlation (SRC) analyses. Please clarify. |
| 216 | Appendix B, SRC | The sediment toxicity test growth endpoints need to be included in the SRC analyses in Appendix B (i.e., *Hyalella azteca* growth and *Chironomus dilutus* growth). |
| 217 | Appendix B, SRC | No information is provided regarding the treatment of the SRC results that are below the detection limit making it difficult to reproduce the results. |
| 218 | Appendix B, SRC | The results of a SRC analysis for all of the COPCs vs. all of the COPC groups should be presented to provide a basis for identifying the COPCs and COPC groups that tend to occur together within the LPRSA. |
| 219 | Appendix B, BICS | a. The biomass results from the Benthic Macroinvertebrate Community Surveys (BICS) must be presented.<br>b. Statistical summaries of the BICS data collected for the LPRSA and Jamaica Bay area, Mullica River area, and areas above Dundee Dam need to be developed and presented (e.g., mean, SD, minimum, maximum, 5th percentile, 10th percentile, 25th percentile, 50th percentile, 75th percentile, 90th percentile, and 95th percentile) to provide an understanding of the basic distributions of the data sets.<br>c. Some of the BICS results are reported as less than detection limit (e.g., Station LPRT16B) which does not make sense and needs to be corrected.<br>d. Only five BICS endpoints are included in Tables B1-1 through B1-4; rationale is not provided for excluding other BICS endpoints in the SRC analysis. |

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| 220 | Appendix B | The discussion of the bivariate correlation analysis (page 286) ignores strong correlations observed between individual contaminants and benthic endpoints for both sediment toxicity and benthic community indices. A summary table should be provided that lists the chemical concentration-endpoint pairs that have r-values less than -0.3 emerging from Tables B1-1b through B1-4b. For the benthic community analysis, there was a high degree of correlation of the Shannon-Weiner and Taxa Richness indices with multiple chemicals, including many metals, pesticides, and PCBs and dioxin Site-wide, many chemicals had elevated correlations (< - 0.3) with H. azteca survival and biomass (Table 6-19). The Bonferroni correction should not be used, as it greatly increases false negatives for statistical significance. The focus of the analysis should be the individual chemicals with strong correlations with individual endpoints, not the total number of significant correlations site-wide. |
| 221 | Appendix D, Pages 10-12, Table 2-1 and Page 26, Section 2.3 | Some of the surface water TRVs selected for the draft BERA are linked to severe effect levels, such as the $LC_{50}$s shown for 2,3,7,8-TCDD and pyrene. Mortality to 50% of the test population is too severe an effect endpoint to serve as an appropriate chronic TRV for the BERA. If no low effect data are available, severe effect levels should be used as a basis for estimating a lower and more appropriate effect level (e.g., $LC_{50}/10$ or $LC_{50}/ACR$). The draft BERA essentially follows this recommended approach for butyl benzyl phthalate and cyanide, estimating a chronic TRV using the 5th percentile acute value/ACR (where the acute value is analogous to the $LC_{50}$). It is unclear why this approach was not applied to TCDD. This comment also applies to lead for amphibian TRVs, where the selected TRV (40 µg/L) is an acute value representing a severe effect endpoint (7-d egg survival $LC_{50}$). |
| 222 | Appendix F, General | This appendix provides toxicity profile information for only two contaminant categories, that of PCBs and PCDDs/PCDFs. Although these represent significant risk driver chemicals for this project, it is unclear why other prominent contaminants (PAHs, mercury, pesticides, other inorganics, etc.) are not summarized here as well. Please clarify and/or add additional information. |
| 223 | Appendix F, Section 3 | This section was reviewed with a focus on the relationship of chlorinated dioxin and furan toxicity to ecological receptors as obtained through literature reviews over the years. As a result of this review, additional information should be added, as outlined below. Please note, however, that many of the cited studies are also applicable to other key contaminant categories found in the lower Passaic River which are known to be similar to PCDDs/PCDFs, in structure and physical & chemical properties, and therefore, toxicity, such as some forms of PCB and PAH compounds. Therefore, the toxicity information in Section 2, PCBs can be bolstered by many of the reference materials provided below, as applicable. In addition, this supplemental information should be considered for incorporation in Appendix E, TRVs. |

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| | | 1. Page 2, paragraph 2: Regarding the uptake of dioxins in aquatic systems, in addition to the information presented, this section should assimilate the more recent, site-specific findings by Dr. Rainer Lohmann and his research team (Khairy, M.A., et al., 2014) on dioxin and dioxin-like compounds in Passaic River sediment, pore-water and biota. This work is also applicable to PCBs and PAHs.<br><br>2. Page 2, paragraph 3: In addition to the described toxic effects to fish, this section should be expanded to include more recent findings of important cardio-vascular and other developmental impacts (swim bladder effects) in fish embryos from sub-lethal exposure to dioxin (Chen, J., 2015; Yue, M. S., et al, 2015; Aluru, N., et al., 2015; Park Yj, et al., 2014). In addition, behavioral effects have also been observed in fish as a result of exposure to PCDDs/PCDFs and related compounds, e.g., PCBs and PAHs. (Weis, 2011). A comprehensive, current, summary of fish impacts from Persistent Organic Pollutants (POPs) is found in Organic Chemical Toxicology of Fishes: Volume 33, Fish Physiology, Chapter 2, Johnson L.L. et al. (2014), which should be consulted to upgrade the information on fish toxicity in this section.<br><br>3. Significantly missing from Appendix F, Section 3, are toxic effects to shellfish, especially oysters and crabs. Due to both the importance of these species in this ecosystem and the area-specific studies that have been performed, the findings of toxic effects from dioxin exposure to the Eastern oyster (Wintermyer, M.L., and Cooper, K.R., 2003, 2006 and 2009) and related published research (Wintermyer, et al., 2004), should be incorporated. Similarly, toxic effects from dioxin exposure to crabs (Weis, J.S., et al 2011; Reichmuth, J.M., et al 2009) should also be incorporated.<br><br>4. In addition, area-specific avian studies on immunotoxicity and adverse reproductive effects based on exposures to TCDDs and PCBs (Grasman, K.A. et al., 2012) have been conducted involving Herring Gulls and Black-Crowned Night Herons from within the Newark Bay Complex. This important area-specific information should be appropriately incorporated in the BERA. |
| 224 | Appendix G, Worksheet G11, Aquatic Plants | The TRV for tributyltin is shown as "0.000". Please revise. |

41

| 225 | Appendix J, Page 6, Section 2.2.1, first paragraph, third sentence | The following statement is made: *"Sediment chemistry data from the estuarine regional areas that were not co-located with toxicity data were not compiled, and are not included in the background dataset."* This approach is inappropriate. Sediment chemistry data collected from background areas should be used regardless of whether it was co-located with toxicity data. Please revise the text and the background dataset accordingly. |
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42